ZELLER+GMELIN

Sustainable Ink Facts

Hot topics in packaging

Zeller+Gmelin
Climate neutral development, production and trade!

Global warming has visible and far-reaching effects on nature, society and the economy. With the Paris climate agreement, the issue has moved very strongly into the public interest. The agreement aims to limit global warming to 1.5 degrees Celsius by 2030, but in any case to well below two degrees Celsius. We support this goal with all the means at our disposal! Industry has a great deal of infl uence and responsibility in this regard. According to the International Energy Agency, industry accounts for around 19 percent of global CO_2 emissions.

How we face up to this responsibility is shown on the following pages.

Sustainable Ink Facts

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climate neutral company

Preface

As a family-run company and a global technology leader in radiation-curing printing ink systems for the packaging industry, Zeller+Gmelin has consistently committed itself to the principle of sustainability. We remain true to our goal of successful technological and economic development, but in harmony with the needs and protection of people and the environment. This is the only way we can leave a liveable planet to future generations.

The principle of sustainability requires continuous improvement from operational processes and products to global supply chains. However, we achieve the most comprehensive impact through rethinking by integrating the sustainability principle into every single decision we make, at all times.

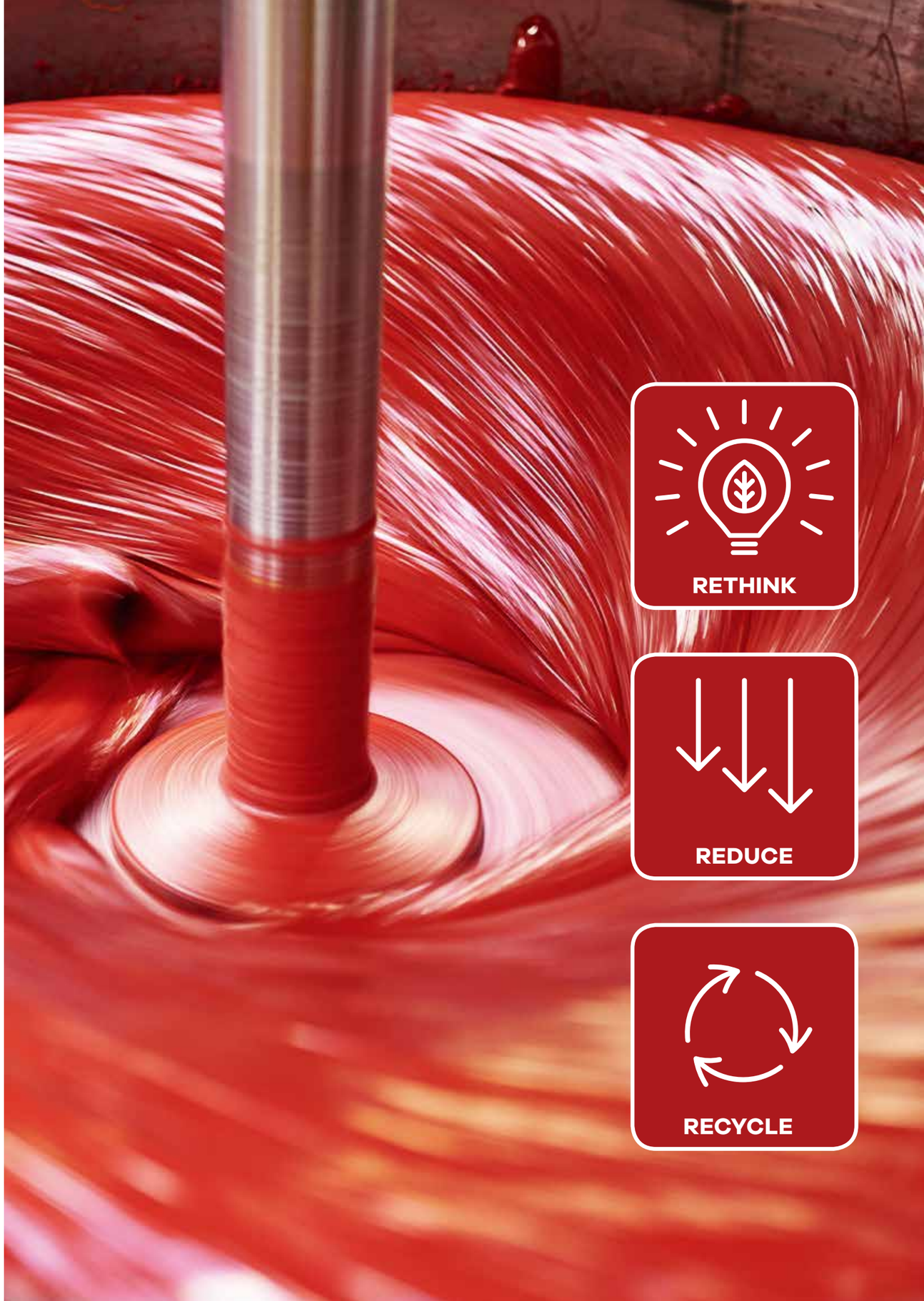
Due to the complexity of the topic, this brochure does not claim to be fully comprehensive. We rather would like to show some examples of what we as a company can currently contribute to this field and where the starting points for sustainable packaging solutions can be found.

Sustainable packaging solutions are always application-related and must be evaluated in the context of the manufacturing process and the materials used. We therefore also like to present starting points and suggestions for our customers, which we will then develop further together towards more sustainable processes and products.

Based on our experience, we can achieve the greatest success if we develop a solution together with all the partners involved, such as packaging manufacturers, substrate manufacturers and ink producers. Let's make packaging better together.

Andreas Koch
Head of Printing Inks

"Let's make packaging better together!"



RETHINK

Innovative printing ink systems for sustainable packaging concepts!

Bio-based raw materials

Printing inks and varnishes based on renewable resources

Bio-based materials generally refer to materials that consist of or are produced from renewable biological resources. For such materials carbon from the natural CO_2 cycle is used and, ideally, at the end of the product's life, only as much CO_2 is emitted as the plant absorbed from the atmosphere during growth. This significantly reduces the material's carbon footprint.

The bio-based fraction of a material is usually calculated by dividing the proportion of bio-based carbon by the total mass of carbon. Inorganic components such as mineral fillers are not taken into account. This proportion can be certified, whereby two certification methods are currently widespread. The biomass balance and C14 certification. In the biomass balance, materials with different bio-based carbon content are mixed during production or storage. Thus, only an average content can be provided. This method is comparable, for example, with the calculation of the share of green electricity in green electricity tariffs. For C14 certification, the proportion of renewable raw materials is explicitly measured for each batch using the so-called C14 method and the exact proportion of bio-based carbon can be specified for each batch.

Our contribution

Today, many raw materials of radiation-curing printing inks and varnishes are made exclusively from fossil raw materials and no bio-based alternatives exist. Nevertheless, a significant proportion of bio-based raw materials is already contained in our printing inks. We are currently working with our suppliers to determine these proportions more precisely. Our goal is to continuously increase the share of bio-based raw materials while keeping or even improving the technical properties of our products. However, it is particularly important to us that bio-based raw materials do not compete with food production. For this reason, for example, we are involved in a joint research project with the Fraunhofer Institute for Materials Recycling and Resource Strategy IWKS to develop a biodegradable, radiation-curing binder obtained from fruit pomace residues. [1]

[1] https://pflanzen.fnr.de/index.php?id=11381&fkz=2220NR224B

"CO_2 reduced for our ecosystem"

Our strategy toward more sustainability

UN Sustainable Development Goals and the role of the printing ink industry

On January 1st, 2016 all UN member states agreed on 17 Sustainable Development Goals (SDGs) which shall be achieved by 2030. All signing states committed themselves to these political goals for sustainable economic, social and ecological development. [2] In addition, indicators were defined for the individual goals to make their progress measurable. These indicators are assessed annually. Furthermore, the goals are formulated in such a way that politics, industry and civil society can and need to provide their contribution to achieving these goals. For example, the Association of the German paint and coating industry (VDL) has identified five SDGs to which the industry sector can make a particular contribution and has appointed these as industry goals. These five goals contain for example to substitute hazardous substances, to ensure quality education or to improve energy efficiency. [3]

As VDL-member Zeller+Gmelin has also committed itself to these goals and we have even identified additional SDGs which we can and want to actively support.

[2] https://unric.org/en/sdg-1/

[3] https://www.wirsindfarbe.de/themen/nachhaltigkeit-und-ressourcen/vdl-branchenziele-2025

Our contribution

As a globally successful chemical company, responsible handling of our products is of utmost importance to us. Safety and care are paramount in developing, producing, transporting and storing. This serves to protect people and the environment, while at the same time ensures the innovative strength and competitiveness of our company.

Furthermore, Zeller+Gmelin is committed to voluntary participation in sustainability initiatives and the “Sustainable Development Goals” of the United Nations.

Within the scope of our possibilities, we actively advocate for the implementation of these goals in our direct sphere of influence.

Further details can be found in our brochure “Zeller+Gmelin – Sustainability Strategy”.

“We act socially and ecologically for the environment and society!”

Food contact materials for sustainable and safe food

Safe food packaging (FCM)

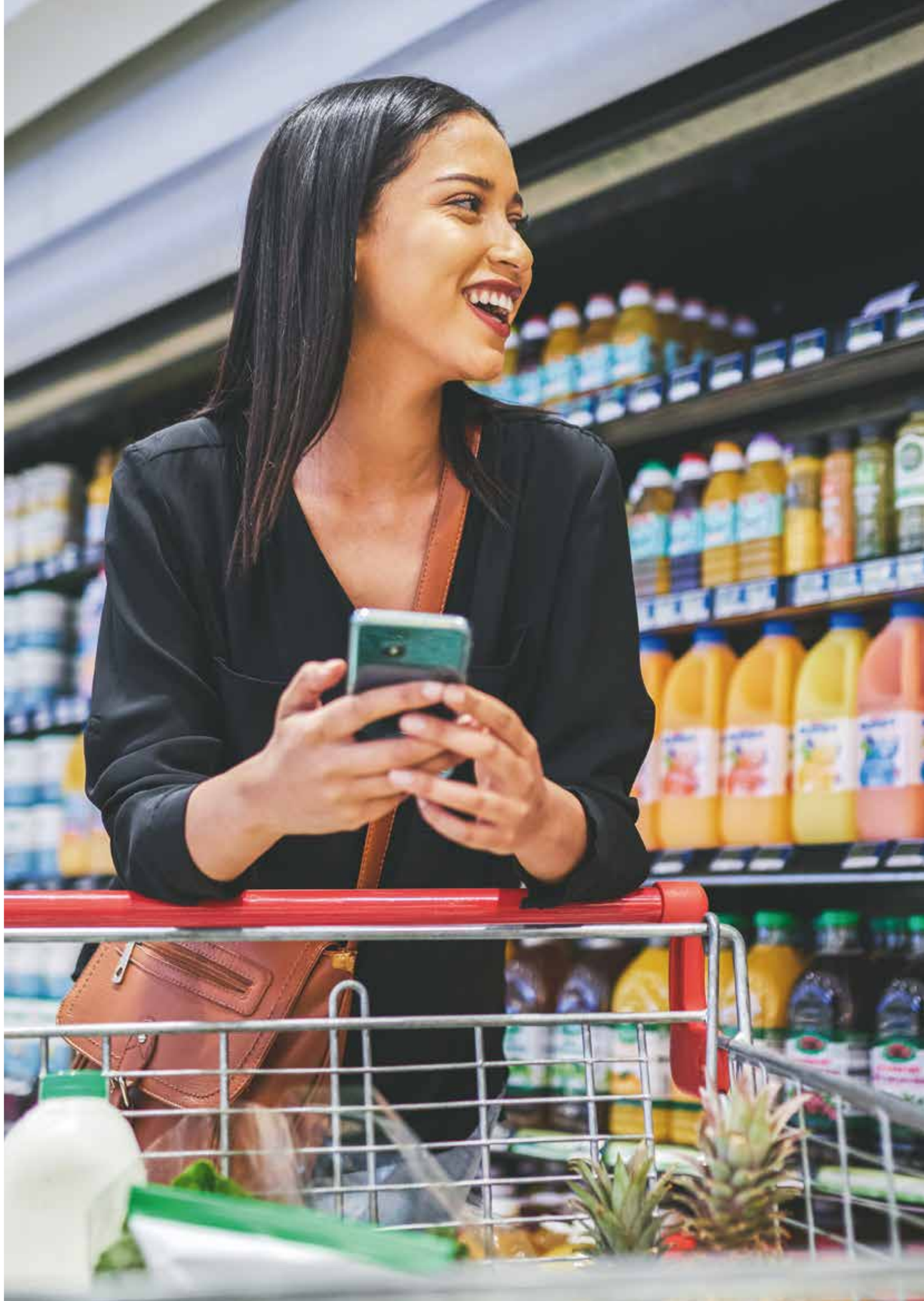
Food packaging has always played an important role in the safety and shelf life of food. Therefore, it is also an integral part of the EU's 'Farm to Fork Strategy' for sustainable food, which is part of the European 'Green Deal'. [4] It assigns a key role to packaging for the sustainability of food. The EU targets to promote the use of innovative and sustainable types of packaging using environmentally friendly, reusable and recyclable materials and to reduce food waste. Furthermore, it aims to move packaging away from a linear system of production-use-disposal to a cycle of production, use, recycling/reuse.

Within this context the EU Framework Regulation (EC) No. 1935/2004 is currently revised. It intends to increase harmonisation within Europe and make individual national legislation such as the German Printing Inks Ordinance obsolete. In addition it is planned to accelerate, the evaluation of substances for use in food contact materials, which could ideally promote innovations towards more sustainable packaging, but also carries the risk of further restriction due to strong generalisation.

Our contribution

Zeller+Gmelin has been a long-time partner to the packaging industry and we always aim to ensure that our current generation of FCM products meet the highest standards in their segment. With our in-house analytical service, we support our customers in the compliance assessment of their products. We are able to competently advise our customers on the use of our printing inks, coatings and adhesives in a wide range of food packaging applications. This includes not only the area of food packaging safety but also the role of our products in the recycling process.

[4] (COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system – COM/2020/381). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0381



Compostability

Printing inks for compostable packaging

The word “compostable” is often associated with disposal via home or garden compost. However, typically it refers to degradation in industrial composting plants. These provide controlled conditions in terms of humidity and temperature in line with EN 13432. Conditions are optimised for quick degradation, usually within a maximum of 90 days.
However, a compostable material is not considered biodegradable under all possible environmental conditions. Compostable materials do not necessarily degradate in the sea or in the forest ground as well.

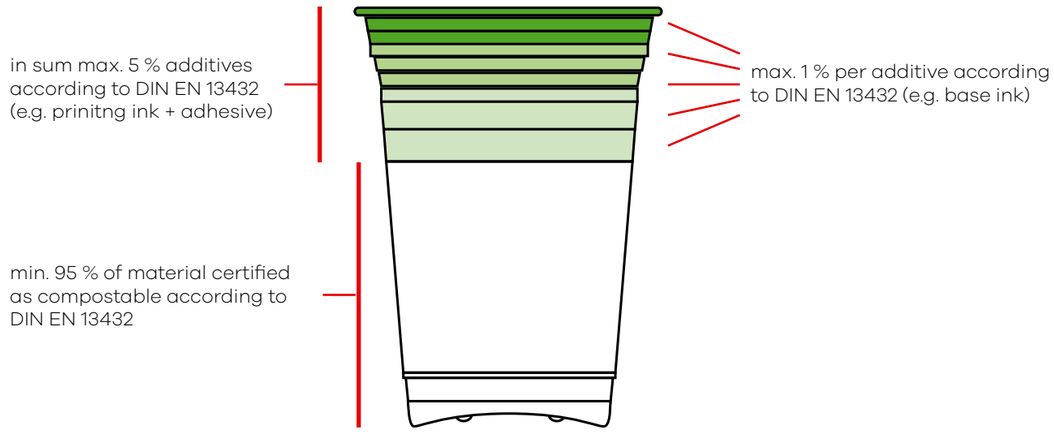
Packaging made of plastic materials can also be approved for industrial or home composting. This requires comprehensive testing and certifications of relevant product properties. For example, these include the heavy metal content, the compost quality and other physicochemical parameters.
The enrichment with heavy metals in the soil and the environment is a relevant negative impact on compost quality. In this context, metals such as zinc and copper must also be assessed. While these are trace nutrients for plants, they can also have a negative influence on growth. Thus, limit values exist for these metals.

Unfortunately, it is still not possible to produce compostable printing inks. This is mainly based on the fact that there are no compostable pigments yet meeting today‘s requirements for colour shade, light fastness and durability. However, printing inks can be certified as additives according to EN 13432 if they meet the relevant requirements.

Our contribution

Our UVACURID C81 for UV container decoration has been certified by an independent test institute as additive according to EN 13432. It can therefore be used, for example, for printing on compostable plastic drinking cups.
To meet the relevant copper limits, a specially developed copper-free blue shade was added to the ink series. As UVACURID C81 is an additive, the 1 % and 5 % restriction for additives must be applied. For this reason, we have created a special calculation tool for our customers to check compliance with these limits.

Compostable packaging according to DIN EN 13432



“Our UVACURID C81 is fit for compostable packaging applications.”

REDUCE

Reducing our environmental footprint across the value chain!

Product safety and consumer protection

Raw materials – safe and sustainable by design

For a sustainable society, it is important that the chemicals we use do not endanger human health or the environment in the short or long term. Therefore, the hazard potential of a substance and the risk it poses to humans and the environment plays an important role alongside its technical properties. The European 'Green Deal' also focuses on this topic through the so-called 'Chemical Strategy for Sustainability' (CSS). [5] The resulting changes to in chemical legislation have not yet been defined in detail, but priorities have already been set and the concept of 'one substance, one assessment' will play a key role. On the one hand, this can reduce the number of animal testing required by law and speed up chemical legislation, but on the other hand, there is also the risk that substances are generally banned, even though their use in individual applications would be possible without endangering people or the environment. In addition, so-called endocrine disruptors (substances with hormone-like properties) and persistent organic pollutants (POP – substances that are not degraded in the environment and thus accumulate in the long term leading to environmental issues) are moving into the regulatory focus. A prominent example are so called Per- and polyfluoroalkyl substances (PFAS).
In case of packaging, the focus is not only on substances that are hazardous to health and the environment, but on those that make recycling more difficult or reduce the quality of the recyclate. This includes, for example, the use of PVC in printing inks, which can release chlorine during recycling and damage the recycling equipment.

[5] https://echa.europa.eu/en/hot-topics/chemicals-strategy-for-sustainability

Our contribution

To ensure that our products do not contain any particularly hazardous raw materials such as CMR 1 substances, we committed ourselves to the EuPIA exclusion policy. [6]
Nevertheless, for technical reasons, it is not always possible to avoid substances which would be "critical" in other fields of application. One example would be UV monomers, as these are often classified as environmentally hazardous. However, as they undergo a chemical reaction while curing, the printed packaging does not pose an environmental hazard. In general, all raw materials we use are risk assessed prior application and we openly communicate the presence of formally "critical" substances and the reason for their presence. Due to our long-standing involvement in the European and German printing ink associations and our long time expertise in the field of energy curing inks, we are always up to date regarding legislative changes and are able to react fast to new requirements.

[6] https://www.eupia.org/our-commitment/eupia-exclusion-policy-for-printing-inks-and-related-products/

"The environmental performance of our products is constantly optimised by our product development specialists in compliance with environmental laws, regulations and carbon footprint."

Greenhouse gas reduction

Carbon footprint of companies and products

In order to achieve the Paris Agreement for reducing global warming, all companies, regardless of their sector and size, are required to make their contribution. Here, the carbon footprint of a company and its products, or the greenhouse gas (GHG) balance, respectively, plays an important role. The Greenhouse Gas Protocol [7], for example, can be applied for the assessment. Herein, the company's carbon footprint is first determined in relation to a so-called "historical base year". From there processes, activities and facilities that promise the largest savings potential can be identified and appropriate emission reduction measures can then be initiated.
Not only direct GHG emissions (Scope 1), but also indirect GHG emissions that arise from the sourcing of raw materials (Scope 3) or the consumption of purchased energy (Scope 2) are relevant. Here, usage of "green" electricity can be a significant factor towards climate neutrality. GHG removals through GHG sinks are also included in the GHG balance. The GHG emissions remaining despite the implementation of effective measures can be compensated by purchasing CO_2 certificates or supporting suitable projects.

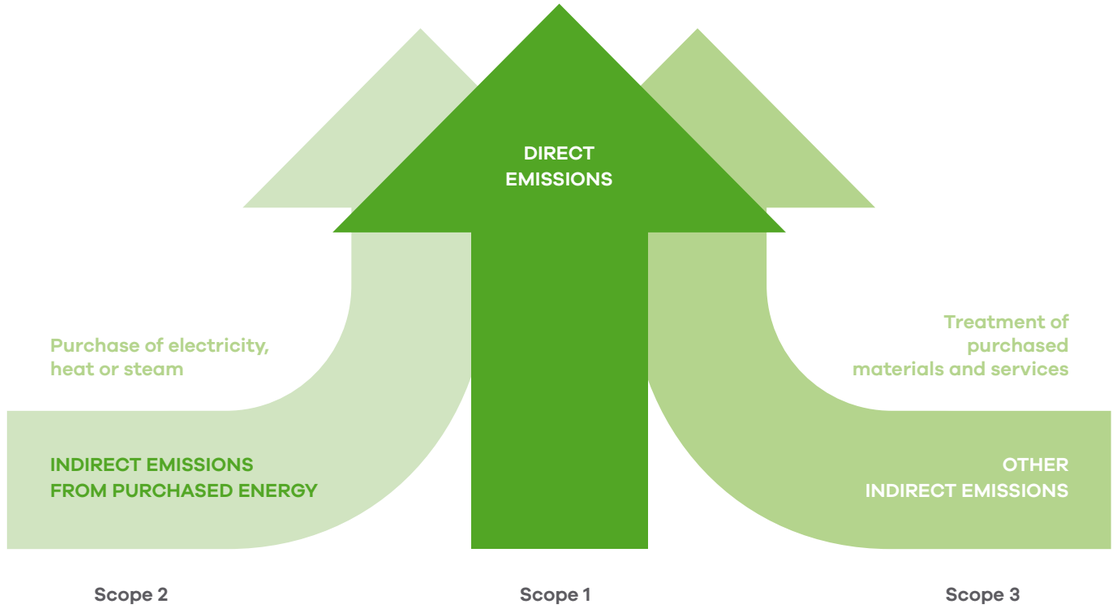
This first step towards climate-neutrality refers to the processes within a company, but does not yet assess the manufactured products. In case of printing inks and varnishes, their carbon footprint mainly depends on their raw materials. For a calculation, detailed data from the supply chain is required. This data is not completely available yet. Thus, for the moment only a statement for printing inks in general is can be provided. [8] According to this estimate, printing inks contribute less than 2 % to the carbon footprint of paper packaging (< 5 % for plastic packaging). A specific statement referring to a particular printing technology or even colour series is not possible yet.

[7] https://ghgprotocol.org/

[8] Life Cycle Assessment of Printing Inks: a generic reference, EuPIA & ecomatters, 2020. https://cepe.org/wp-content/uploads/2020/09/20012020-Eco-Footprint-and-Screening-of-Virtual-reference-Leaflet-RM.pdf

Our contribution

Due to the urgency of this issue, we have already implemented climate-neutral business operations for the Eislingen site in 2019. Since 2020, all business processes have been climate-neutral in accordance with the GHG Protocol. Further details can also be found in our brochure 'Climate neutrality – Our way to a climate neutral company'. This approach ensures in the first instance that we do not add to the carbon footprint of our printing inks, varnishes and adhesives. Due to a lack of raw material data, we are not able to provide a product-specific statement on the carbon footprint of our products yet (Scope 1–3). We are working on obtaining the relevant data. As soon as it is available, we will be able to provide a more detailed view.



"We have already been developing, producing and trading in a climate-neutral manner since 2020!"

UV LED curing inks and varnishes

Increased energy efficiency in UV curing

Radiation-curing inks and coatings offer the advantage of drying within fractions of a second using high-energy UV or electron beams. Compared to conventional drying systems such as oxidative drying, solvent- or water-based printing inks, this provides the advantage that thermal drying based on fossil fuels such as natural gas is not required.
While conventional UV lamps have quite high power requirements, the more energy-efficient UV LED curing technology has been gradually establishing over the past few years.
Compared to conventional mercury vapour lamps, UV LED dryers only emit light at a specific wavelength, where mercury vapour lamp also includes wavelengths which do not play a role for UV curing. For example visible or infrared light (heat). Thus, the conversion of electricity into a specific wavelength by LEDs already enables a lower energy consumption of the curing system.
Due to the reduced heat-generation, it is possible to print on thinner and thus more heat-sensitive substrates and less cooling is required as well. In addition, UV LED-lamps have a longer service life, which saves valuable resources.
Since UV LED lamps do not emit in the UV-C range, no harmful ozone is generated which usually has to be extracted by exhaust fans. Furthermore, UV LED lamps do not contain any highly toxic mercury, which has to be recycled at great expense or can lead to health hazards if a lamp breaks.
While mercury vapour lamps require a heating-up time before use, UV LEDs can be switched on and off within fractions of a second. This allows UV LED lamps to be switched off during set-up time.
Overall, the energy requirements for curing can be reduced up to 40 % with UV LEDs compared to mercury vapour lamps, and even by up to 96 % in changeover mode. [9]

[9] M. Ziebold (Heidelberger Druckmaschinen), 12. Fogra-Anwenderforum UV-Druck, 06.09.2022.

Our contribution

As specialist for energy curing inks it is our goal for the future is to offer our customers printing ink systems specifically adapted to the LED UV curing at constant or improved technical performance, and an equal or lower migration potential for FCM inks and varnishes. When introducing new LED ink series, Zeller+Gmelin is leading the market and develops new application areas where UV LED curing is not fully operational yet. In close collaboration with UV LED manufacturers and machine manufacturers we are able to optimize our inks and printing processes to better implement UV LED technology.

“Economical and resource-saving!”

Extended Colour Gamut Printing

Reduce ink waste and energy consumtion during changeover with Extended Colour Gamut Printing (ECG)

The varying order quantity of print jobs continues to increase, due to smaller and more targeted special campaigns or the increasing number of quickly changing product variants. As a result, more frequent changeovers are necessary. This also increases the number of spot colours, which are often not consumed completely have to be stored and eventually disposed of expensively at the end of their shelf life. The increasing number of job changes result in more press downtime and more waste when cleaning the press for ink changes.

‘Extended colour gamut printing’ (ECG) offers a solution to this complex problem. An extended colour gamut is achieved by using up to seven primary colours. The colour gamut of CMYK is extended by the colour shades orange, green and violet. In ECG printing this allows to access up to 80 % of the Pantone® colours without additional spot colours.

While the ECG system works with seven colours, conventionally only four screen angles can be used. However, there are various technological solutions to enable the screening of additional colours. For example, Bellissima Digitally Modulated Screening (DMS) uses an innovative technology that combines the best features of AM, FM, XM, GS and CS screens and avoids their limitations and problems. ESKO’s Equinox solution, on the other hand, allows to work with both standard process colours and extended ECG colours.

The overall goal is to reduce the total amount of inks in production, to a single fixed set of ECG colours on press. In addition to reducing material and ink waste, this also has economic benefits. Changeover time and waste per job, are reduced. This increases productivity and reduces energy consumption per print job.

Our contribution

Based on our standard CMYK in UVAFLEX Y81, Y80 and Y581 in combination with the intense and brilliant mono-pigmented Z-Base ink shades orange, green and violet we offer a full ECG palette with good press performance. Simply contact us if you like to learn more about the topic of ‘Extended Colour Gamut Printing’ and its implementation.

RECYCLE

We pursue the goal – less disposal through recycling!

Paper recycling

Deinking of paper and board

More than 70 % of the waste paper in Europa enters the recycling stream to become recycling paper. [10] During recycling, the most important step is the deinking process, which ensures that the ink residues are removed from the recovered paper. This ensures that the recycled paper is as pure white as possible. For this purpose, the recovered paper undergoes various mechanical and chemical processes within the paper recycling process.
As radiation-curing inks can form a dense, cross-linked polymer film around the paper fibres they can be challenging to deink, and sometimes ink residues remain in the pulp. However, the combination of ink and printed paper grade has a significant influence on the deinkability of the print.

Whether deinking is possible can be evaluated in advance. INGEDE Method 11 [11] can be applied to clarify whether a material combination is suitable for the deinking process. A substrate sample (printed material) is used to determine whether the dirt speck content after the deinking process is sufficiently low for the paper industry. If this is the case, the applied material combination can be classified as deinkable.

[10] https://www.paperforrecycling.eu/
[11] http://pub.ingede.com/methoden/

Our contribution

Zeller+Gmelin UV inks developed for printing on paper, already undergo testing according to INGEDE Method 11 within the development process. Furthermore, we developed an in-house method for preliminary deinking testing. This enables us to control the deinkability of the inks at an early development stage and to adjust the corresponding parameters in order to provide our customers with deinkable UV printing inks. Especially our UVALUX U40 as well as UVALUX U41 were classified by INGEDE Method 11 as good deinkable at the highest score of 100 points. Our UVALUX LED U540 was also rated as good deinkable when applied to coated paper. This enables Zeller+Gmelin to offer its customers all options with regard to paper recycling.

“Our UVALUX U40 as well as UVALUX U41 are considered deinkable at the highest score.”

Printed labels in PET recycling

Wash-off requirements in the recycling process

While Polyethylene terephthalate (PET) is not the most widely used packaging plastic in terms of volume, it currently has the highest recycling rate in the EU as well as the highest recycling standards. This is largely due to the widespread use of PET beverage bottles. In Germany and Norway, for example, already 90 % of them are recycled and the EU has set an EU-wide recycling target of 90 % for PET bottles by 2030. The advantages of PET recycling are that PET is often collected separately and it is primarily used as a mono-material. Due to its density it can also be easily separate from PP/PE. For example, PET settles in water, while PE/PP floats (so called sink-float separation). Due to the high economic efficiency, hot washing of PET in caustic soda can also be applied. This increases the quality of the recyclate and eases the separation of foreign materials like food residues or labels. Due to the high level of standardisation of PET recycling, the recycling industry also has the most specific recommendations for PET packaging. [12] For example, it is crucial for good PET recycling that all non-PET components (e.g. lid, sleeve, wrap-around, self-adhesive label) float after shredding and hot washing in the sink-float process. For this reason, special washable self-adhesive labels with a low density were developed. When printing such labels, the applied ink should neither increase the density of the label significantly, nor should it bleed during hot washing (i.e. discolour the washing solution). Furthermore, it is recommended to avoid Bisphenol A based materials to avoid PET contamination. [13]

[12] https://recyclass.eu/recyclability/design-for-recycling-guidelines/

[13] Precautionary measure on possible sources of Bisphenol in inks and varnishes used for labels on PET bottles, FINAT, February 2023

Our contribution

Our study on bleeding of our printing inks based on QT507 – Label Bleeding [14] have shown that the pigments used have a significant influence on the bleeding of the inks. Furthermore, ink adhesion also plays a major role.
For self-adhesive labels, a material with a topcoat for good ink adhesion is preferable to a corona pre-treatment. We also recommend varnishing the labels to prevent bleeding. UVAFLEX YL-7G106FCM and UVEFLEX YL-7G207FCM, for example, have been successfully tested. In line with the FINAT recommendation, we are also able to provide inks and varnishes without Bisphenol A based raw materials. Since opaque white has a much higher density than coloured inks, we also advise against full surface printing of opaque white to not negatively influence the sink-float process.

[14] https://www.epbp.org/download/318/qt-507-label-bleeding

“Many valuable resources are lost through disposal! We pursue the goal – less disposal through recycling!”

Recycling of polyethylene and polypropylene packaging

The role of printing inks in the recycling of HDPE/LDPE/PP

The group of polyolefins (HDPE/LDPE/PP) is the most widely used type of plastic packaging material. According to an EU statistics in 2018 around 9 million tons of polyolefin packaging waste were created in the EU. While only 3.5 million tons were collected, only 54 % of the collected packaging was actually recycled. [15] While there is significant room for improvement in terms of collection, recycling of polyolefin packaging has to be increased as well. Recyclers typically differentiate between PE films, PP films, HDPE containers & tubes and PP containers & tubes. All as natural or coloured material. As todays recycling technologies do not include deinking, printed packaging will typically be evaluated for its suitability for recycling into coloured material. In comparison to PET recycling polyolefin recycling usually only involves a cold washing step and self-adhesive labels will often stay on the polyolefin substrate. Thus, there is no difference in terms of printing ink whether a polyolefin packaging is printed directly or a printed label is applied. Depending on overall packaging design for direct printing a good compatibility with the coloured material stream can be realised. Especially for monomaterial containers. This is typically achieved when the inks are non-bleeding (i.e. do not discolourate the washing solution) and inks comply with European packaging legislation (e.g. heavy metal limits) as well as the EuPIA exclusion policy. Furthermore, it is recommended to reduce the amount of ink on the packaging.

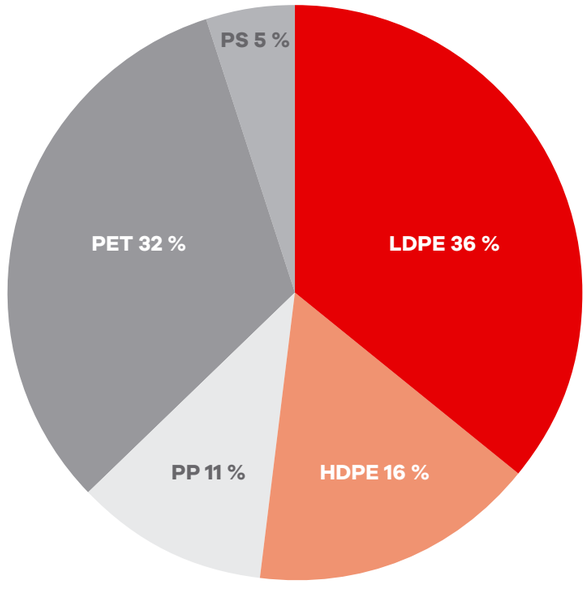
[15] Watkins, E., Romagnoli, V., Kirhensteine, I., Ruckley, F., Kreißig, J., Mitsios, A. and Pantzar, M., Support to the Circular Plastics Alliance in establishing a work plan to develop guidelines and standards on design-for-recycling of plastic products, Saveyn, H. and Garbarino, E. editor(s), Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-25373-0, doi:10.2760/936397, JRC122453.
https://publications.jrc.ec.europa.eu/repository/handle/JRC122453

Our contribution

As Zeller+Gmelin we have committed ourselves to the EuPIA Exclusion policy and all our inks, varnishes and adhesives comply with it. Based on internal lab-testing of UVACURID C81 and UVAROLID UV following the RecyClass “Washing Quick Test Procedure for Bleeding Inks Printed on HDPE & PP Containers” [16] we are able to state that the non-bleeding requirement is expected to be met. However, due to the multitude of packaging solutions we recommend testing of the final packaging.

[16] https://recyclass.eu/recyclability/test-methods/

EU packaging volume 2018 [15]



Deinking of plastic substrates

A novel solution towards high-quality recyclate

The term deinking describes processes removing the printing ink from the substrate during recycling. By deinking the coloured pigments bound in the ink layer are removed and a colourless recycled material can be retrieved. While deinking has been an established and standardised part of paper recycling for decades, a comparable process is currently lacking in large-scale plastics recycling. However, the deinking of plastics can be a key technology for the recovery of high quality colourless plastic recyclate. Several approaches already exist, both water and solvent based. At present, however, recycling companies typically avoid this topic due to the additional costs involved. Unfortunately the higher quality of the recyclate obtained does not (yet) provide sufficient added value for recycling. In the US, on the other hand, the first standardised PET recycling processes including deinking already exist and deinkable shrink sleeves for PET bottles are allowed. [17] But also in Europa several companies are already operating the first smaller deinking plants and further developments are ongoing. [18] Today, deinking can be particularly useful for printers who having large quantities of printed and unfilled mono materials at hand. This material can be directly deinked and returned to the internal raw material stream without time-consuming sorting and cleaning and reduces the required amount of virgin plastic. While it is hardly possible to use recycled material in food packaging materials under European legislation today, the EU has also defined ambitious targets for recycled material in food packaging. Thus, a change in legislation can be expected in the future.

[17] https://plasticsrecycling.org/images/Design-Guidance-Tests/APR-RES-LBL-2-shrink-label-resource.pdf
[18] https://cordis.europa.eu/article/id/435575-deinking-innovation-promises-plastic-recycling-boost

Our contribution

We are convinced that the deinking of plastic substrates can make a key contribution to the recyclability of plastic packaging, especially for directly printed packaging. For this reason, we have already been working on this topic in the past in various customer and research projects. Based on our experience we are able to support customers who, for example, want to address the topic of recycling their printed waste.

EXPERTLY DONE.

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